Telecom Churn Case Study

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SUMMARY

After comprehensively analyzing the telecom churn data, a multitude of insights have been gleaned regarding high value customer behavior in the first three months before churning. This analysis shed light on various aspects, including the minutes of usage of local incoming and outgoing calls, recharge amount in the third month (action phase), and roaming tariffs based on which following business strategy can help in limiting the high value customer churning.

1) Company need to investigate the local incoming and outgoing plans.
2) Can revise or offer discounts on roaming charges for high value customers.
3) Can offer discounts for outgoing std and all kind of calls outside the operator network in non peak hours.

Telecom Churn Data

Technical analysis

- Importing libraries
- Importing and understanding data
- Data cleaning: missing value treatment
- EDA and data visualization
- Scaling and train test split
- Clearing class imbalance
- Model building : Logistic regression model
- Random forest
- Final model selection
- Conclusion using feature importance

1) Importing libraries and data understanding:

- All the necessary libraries are imported
- Data is imported using pandas
- Filtered high value customers only as the business objective is to define high-value customers based on those who have recharged with an amount more than or equal to X, where X is the 70th percentile of the average recharge amount in the first two months (the good phase).

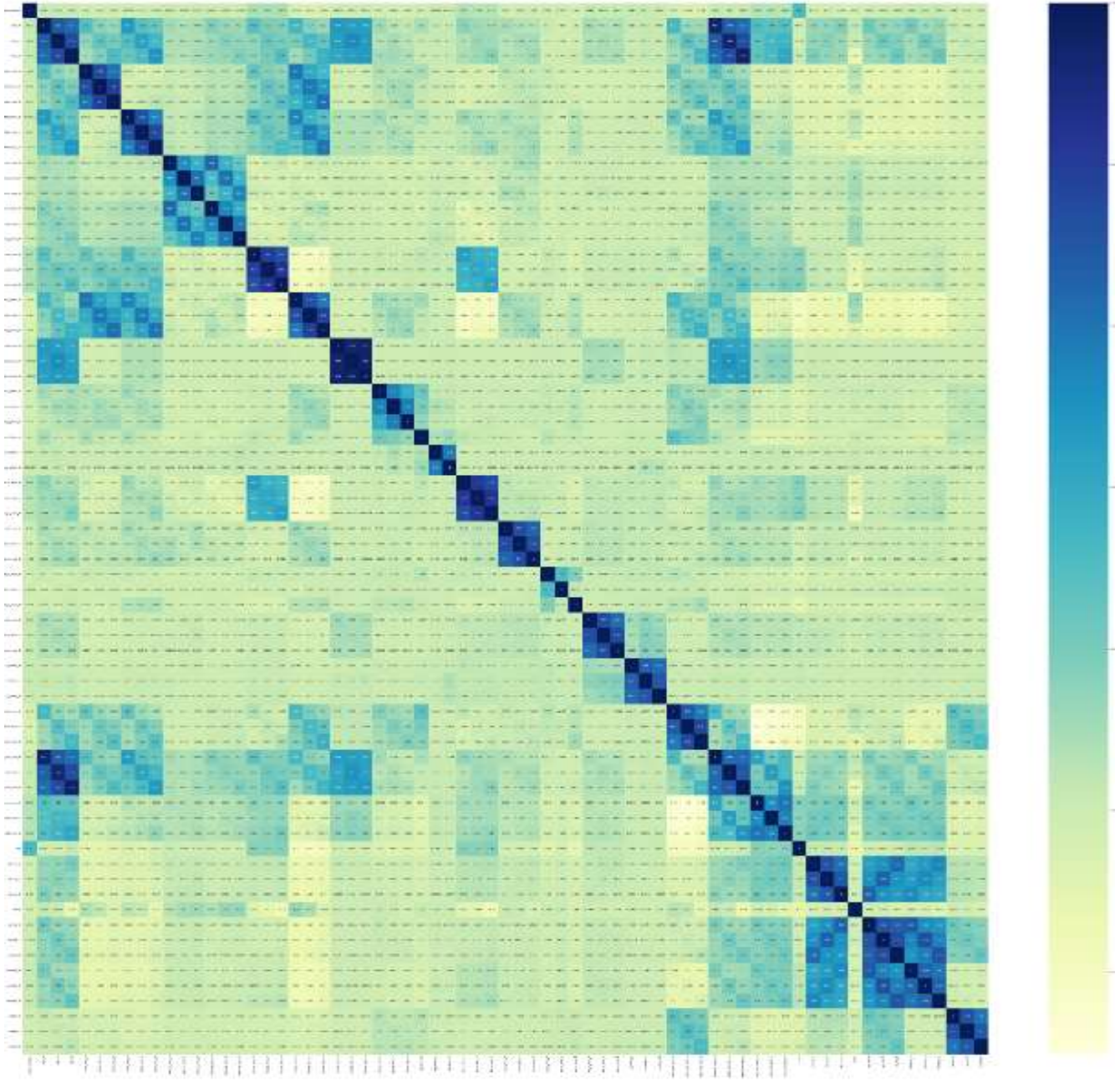
2) Data cleaning and missing value treatment:

- Checked for the missing values and dropped the features with more than 50% missing values.
- Tag the churned customers as churn=1 and no churn=0 based on the fourth month as per the following definition: Those who have not made any calls (either incoming or outgoing) AND have not used mobile internet even once in the churn phase.
- Created the 'churn' columns and features with 9^{th} month are dropped.
- Date columns are dropped
- 2g and 3g columns are combined

3) EDA and data visualization:

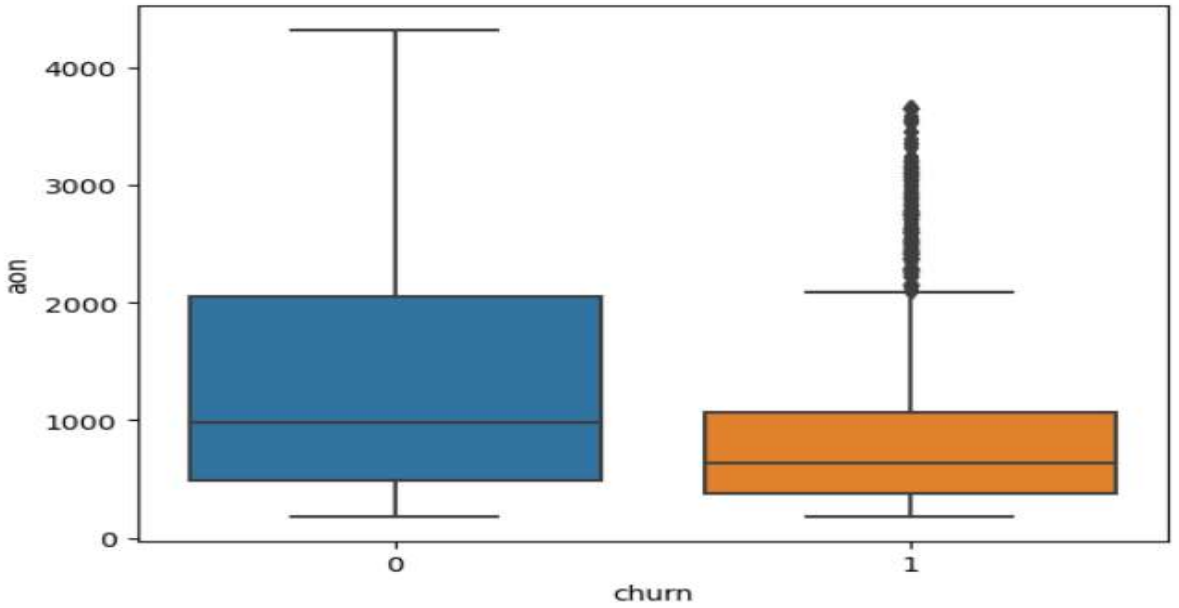
- There are no categorical features so no need of dummy variables
- Checked the multicollinearity of the features by plotting the heatmap.
- Heatmap of features to check the multi-collinearity

- From the heatmap observe that some features like 'total_rech_amt_6', 'total_rech_amt_7', 'total_rech_amt_8', 'arpu_6', 'arpu_7', and 'arpu_8' are highly correlated.



3) Data visualization:

Box plot for the age on network against the churn to check for the impact of the recency on the churn.



Inference: *The users who have joined the industry recently are more likely to churn. The churning decreases as the customer retains in the network.*

Use heatmap to check correlation between the target variable ‘churn’ and the other features.

Inference: *Average revenue for month 8 has negative correlation with churn.*
Average roaming and outgoing calls for 6 & 7th months are positively correlated with churn.

4) Preparation for model building:

- Splitting the data in test and train
- Normalization using the data scaling
- Fixing class imbalance

5) Model building:

- For the prediction of churned customers, fitted variety of models and selected the one best predictor of churn.
- Created logistic regression model using recursive feature elimination
- Assessed the model
- Created Random forest model

6) Model selection:

- Created the parameter grid based on the results of random search
- Created a based model
- Instantiate the grid search model
- Fit the grid search to the data
- Checked optimal accuracy score
- Checked feature importance

7) Predictions:

- The high value churner's local incoming and outgoing usage was more than that of non-churners, but the churning rate is dropped with the tenure or age of network means the churning reduces as the customer is older in the network.
- The Network operators must investigate roaming tariffs or services as it is one of the important features observed in the churned customers.

8) Business solutions:

- For high value customers company can introduce offers on local outgoing calls like discounted rates on the outgoing voice calls.
- New campaign can be introduced to offer the high value customers some percent of minutes of usage as free.

- Network operator can offer plans as per the trend and value of the customer.

- Network operators can check the services with roaming partners to ensure the service quality during roaming.
- Discounts or offers on roaming rates can help attracting the customers and can check the churning.

Thank You